Hurricane Wilma

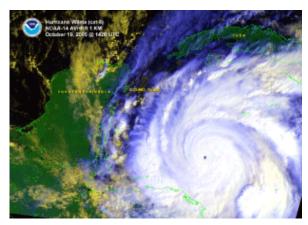
National Oceanic and Atmospheric Administration

National Climatic Data Center

Note: Data in this report are compiled from preliminary statistics Updated 31 October 2005

Overview

Hurricane Wilma was the third hurricane of the Atlantic 2005 season to reach category 5 status, setting a new record for the seasonal number of category 5 storms. It was the 12th hurricane of the season, tying 1969 for the most in any season. Wilma was also the most intense hurricane on record in the Atlantic.



Satellite Image of Wilma at Its Peak

The most intense storm on record for the Atlantic Basin, minimum central pressure for

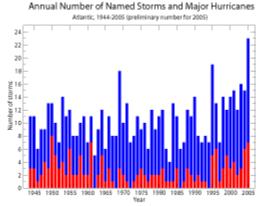
Wilma, on October 19th reached 882 mb. Peak sustained winds reached 175 mph as the storm tracked west through the Caribbean Sea. Weakening occurred due to an eyewall replacement cycle prior to landfall on the Yucatan Peninsula on the 21st, but the storm also expanded laterally causing hurricane force winds to extend from only 15 miles from the eye (early on the 19th), to 85 miles during the hours before landfall in Mexico. After battering the Yucatan for a full day, Wilma recurved over the next 2 days to make landfall in Florida on the 24th as a category 3 storm.

At its peak intensity, Wilma's minimum central pressure reached 882 mb, the lowest pressure ever recorded for an Atlantic tropical cyclone. The top 3 most intense storms (as measured by minimum central pressure) are:

- Hurricane Wilma, October 19th 2005, 882mb, category 5, near 175 mph
- Hurricane Gilbert, September 14th 1988, 888mb, category 5, near 185 mph
- <u>The Labor Day Hurricane</u>, September 2, 1935, 892 mb, Category 5, approaching 200 mph

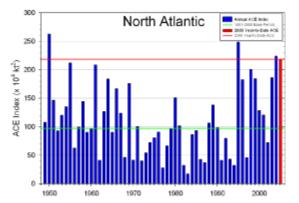
So far in 2005 (as of the first week in November), 23 named storms have formed, with 13 of those becoming hurricanes and 7 of those (<u>Dennis</u>, <u>Emily</u>, <u>Katrina</u>, <u>Maria</u>, <u>Rita</u>, Wilma, and Beta) designated as '<u>major</u>'. Of the ten tropical storms, three (Arlene, Cindy and Franklin) were very close to hurricane strength with a maximum sustained windspeed of around 70 mph, as compared to the 74 mph required to designate the storm a hurricane.

As shown in the figures to the right, tropical cyclone activity in the Atlantic basin has been above normal since 1995. This has been largely in response to the active phase of the <u>multi-decadal signal</u>. The average number of named storms since 1995 has been 13, compared to 8.6 during the preceding 25 years during which time the multi-decadal signal was in an inactive phase. An average of 7.7 hurricanes and 3.6 major hurricanes since 1995 compares to 5 hurricanes and 1.5 major hurricanes from 1970-1994.



Annual Totals of Atlantic Basin Named Storms and Hurricanes

Characteristics of an active multi-decadal signal in the Atlantic include: warmer SSTs in the tropical Atlantic region, an amplified sub-tropical ridge at upper levels across the central and eastern North Atlantic, reduced vertical wind shear in the deep tropics over the central North Atlantic, and an African Easterly Jet (AEJ) that is favorable for promoting the development and intensification of tropical disturbances moving westward off the coast of Africa. Recent studies also indicate that in addition to this multi-decadal oscillation the destructive power of hurricanes has generally



Annual Totals of Atlantic Basin Accumulated
Cyclone Energy (ACE) Index

increased since the mid-1970s, when the period of the most rapid increase in global ocean and land temperatures began.

However, it is important to note that increased tropical cyclone activity does not necessarily translate into an increase in the number of landfalling tropical storms or hurricanes. Six of the past 11 years have had one or fewer landfalling hurricanes along the Gulf Coast, and there is no long-term trend in the number of landfalling hurricanes since 1900.

Meteorology

The following is a synopsis of the conditions that produced historic Hurricane Wilma, as well as some preliminary information on the <u>major impacts</u>. Note that reports are constantly being updated as a result of new information, and this page will be updated during the next month as new reports and data become available.

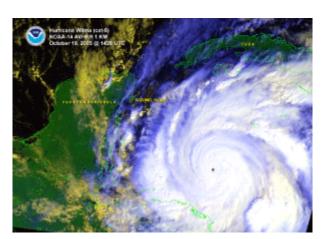


Track map Courtesy of CIMSS/SSEC

Tropical Depression 24 developed in the western Caribbean on the evening of October 15th from a persistent area of low pressure. Very little strengthening occurred during the subsequent 24 hours until a burst of deep convection overnight on the 16th/17th led to an increase in intensity such that the depression became Tropical Storm Wilma early on the 17th. Gradually strengthening while moving west through the Caribbean Sea, Wilma reached category 1 hurricane strength on the 18th, becoming the 12th hurricane of the season

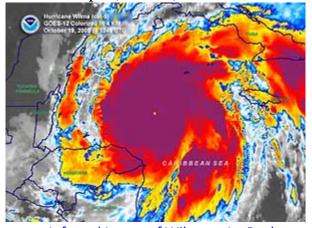
and tying the record set in 1969 for the most hurricanes in a season.

By the evening of the 18th, Wilma had developed a very small eye (8-9 miles in diameter) and the central pressure had dropped from 970mb to 954mb in 3 hours and 14 minutes. Windspeeds of 110 mph (95 knots) indicated a very strong category 2 hurricane at 11pm on the 18th. Two hours later, at 1am on the 19th, Wilma's pressure had fallen to 901 mb and windspeeds were at 150 mph (130 kts) - a very strong category 4 hurricane. At the official 5am advisory on the 19th, Wilma had become the most intense hurricane ever recorded in the Atlantic Basin.



Satellite Image of Wilma at Its Peak

With a minimum pressure of 882mb, it surpassed Hurricane Gilbert (September, 1988 - 888mb) for the record. The eye was a mere 2-4 miles in diameter and windspeeds were near 175 mph (150 kts).

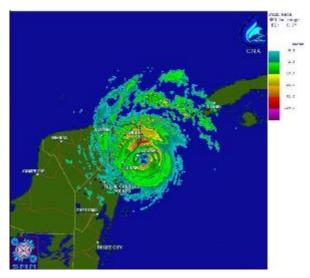


Infrared Image of Wilma at Its Peak

During the next 24 hours, as Wilma tracked westward, an eyewall replacement cycle was observed, enlarging the eye and decreasing maximum windspeed so that the storm weakened to a strong category 4. However, as the storm weakened somewhat, it also increased in lateral size causing hurricane force winds to extend from only 15 miles from the eye (early on the 19th), to 85 miles during the hours before landfall in Mexico on the 21st. The strengthening phase of the eyewall replacement cycle did not materialize before the hurricane

began interacting with the land and despite a gradually tightening eye, the windspeeds did not regain category 5 status and Wilma made landfall over northeastern Cozumel, Mexico with maximum sustained winds of around 140 mph(120 kts).

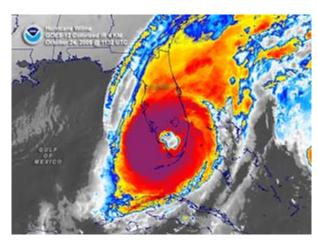
Hurricane Wilma slowed in forward speed and drifted northward across the northeastern tip of the Yucatan Peninsula during the 22nd, reemerging into the Gulf of Mexico late that day. Wilma weakened over land but at its weakest, before re-emerging over water, the storm was still a category 2 hurricane with winds of nearly 100 mph (85 kts). The track changed to gain a more northeasterly component on the 23rd as Wilma increased in forward speed and began to move towards Florida. With its windfield expanding, and the eye increasing to a very large 50-miles wide, Hurricane Wilma intensified to regain category 3 status with windspeeds of 115 mph (100 kts). Continuing to intensify to a very



Radar-Estimated Rainfall as Wilma Moves Toward Mexico

strong category 3 storm 125 mph (110 kts), Wilma made landfall on the southwest coast of Florida, near Naples around 7am on the 24th. Due the increased forward speed of Wilma, the hurricane exited the coast of Florida near Palm Beach just 4 hours later with the eye completely intact and windspeeds of 100 mph (90 kts).

Hurricane Wilma re-intensified to reach a very strong category 3 status again with windspeeds of 125 mph (110 kts) after it exited the eastern Florida coast and began accelerating to the northeast. Wilma gradually weakened therafter and became an extratropical storm on October 25th about 205 miles south-southeast of Halifax, Nova Scotia.



Wilma Making Landfall in Florida

Impacts

Loss of Life

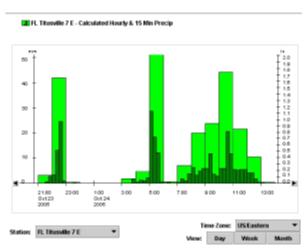
Preliminary estimates indicate that at least 19 people were killed as a result of Wilma's rains and wind across the Caribbean and Mexico. In Florida, at least 6 people died as a result of the storm.

Rainfall and Flooding

Although confirmation of rainfall rates will take several weeks/months, rainfall clearly exceeded tens of inches in Cancun as Hurricane Wilma slowly moved across the Yucatan Peninsula. Isla Mujeres, which is an island located immediately off the coast from Cancun received over 68 inches of rain in 42 hours (data courtesy of the Mexican Meteorological Service (the Servicio Meteorologico Nacionale). Early on the morning of the 22nd, rainfall rates exceeded 6 inches per hour at the Isla Mujeres station.

Waves topped the sea wall in Havana, Cuba and much of the downtown and central sections of the capital city were under as much as 6 feet of water. Widespread flooding as a result of storm surge submerged parts of the Florida Keys, with parts of Key West under several feet of water. However, water receded quickly in the island city and significant damage was not extensive.

Rainfall in parts of Florida exceeded 9 inches, despite the rapid movement of the storm. Fifteen-minute rainfall exceeded an inch and over 2 inches fell in an hour (5-6am Oct 24) at the Titusville Climate Reference Network station shown in the graphic to the right. (Large green bars are rainfall per hour and narrow bars depict rainfall per 15 minutes)



Titusville Calculated Hourly and 15 Minute Precipitation

Power Outages

Over six million people were without power in Florida, including the entire stretch of the Florida Keys after Wilma made landfall on the 24th. It was estimated the full power restoration would take weeks.

Cost

As of October 25th, there are only very preliminary estimates of cost from Hurricane Wilma. For Florida, it is estimated to be over a billion dollars.

Travel

Cancun airport was closed during and immediately following Wilma's landfall, stranding hundreds of tourists in the popular tourist destination. Route 1 was closed through the Florida Keys due to flooding along the highway. Miami, Fort Lauderdale and Key West Airports were also closed as the hurricane passed across the Peninsula and throughout the following day. Miami's metro rail system was also closed following the storm.

Useful Links

- NCDC's Tropical Cyclone Overview Page
- NOAA's Climate Reference Network
- The National Weather Service
- NOAA's National Hurricane Center
- NOAA's Climate Prediction Center

Contact Information

For more information about content specific to this page, please **Contact Us**.

Citing this Article

"Hurricane Wilma", October 2005, NOAA's National Climatic Data Center, Asheville, NC